## Analysis of Food Dyes in Beverages AP Chemistry Advanced Inquiry Lab

#### Introduction

Assume an investigative role and design a valid procedure using spectroscopy and graphical analysis to determine the concentration of FD&C food dyes in sports drinks. The investigation will develop and test your skills in preparing accurate serial dilutions, understanding spectroscopic measurements, and extrapolating from graphical data.

#### Concepts

- Spectroscopy
- Absorbance vs. transmittance
- Wavelength
- · Consumer science
- Beer's law
- · Solution concentration

#### Background

The color of a solution is an important tool used by scientists to gain information about the composition of the solution. Color is a physical property that is useful for both qualitative and quantitative analysis. A qualitative method yields information about the nature or type of compound in a sample, where as a quantitative method provides numerical data for the amount of a compound in a sample.

Spectroscopy is the study of the interaction of light and matter. A spectrophotometer is an instrument that uses electromagnetic radiation from a selected region of the electromagnetic spectrum, such as ultraviolet, visible or infrared light, to analyze the absorption or transmission of radiation by a sample. The basic function of a spectrophotometer is shown in Figure 1. The electromagnetic spectrum (see Figure 2) is the entire range of possible wavelengths or frequencies of electromagnetic radiation. In this investigation a visible spectrophotometer will be used—it scans the visible region of the electromagnetic spectrum, from 380 nm to 750 nm. Typical light sources for visible spectrophotometers include xenon and tungsten lamps.

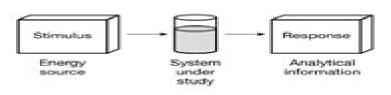


Figure 1.

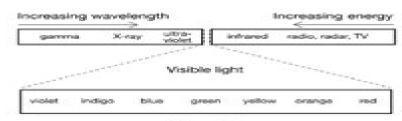


Figure 2.

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